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idealistic ethics are escaped. It is difficult to see what "right" can mean except that conduct which aims at the "good," the "greatest good," or a certain important set of goods. It is difficult to see what "virtue" can mean except those habits, dispositions, or personal attitudes which operate so as normally to produce the selected goods. This scientific approach would enable us to avoid the exclusion of any goods, the puritanical attitude of religious enthusiasm, the intolerant denunciation of other moral codes and other personal choices of alternative goods, and the absolutism which finds in each situation one and only one supreme good. It would enable us to retain our own standards without becoming bigoted, to learn to compromise when compromise alone is the highest morality, to fit in our standards with competing standards, to unify our own lives without trying to force our own codes upon our fellows, to use force where force is necessary, not to make right, but to make a cherished right prevail, and to work towards a higher synthesis whereby destructive force becomes antiquated and might be replaced by some other less evil means of arbitrary decision. It would enable us to recognize the essentially voluntary and personal character of the moral life, the need for constant revision and enlargement, the incidental enrichment of life by new goods, generous consideration of and cooperative enterprise with the followers of non-identical codes, the constant adjustment of moral principles to the facts of which they are but the shadow, and the factual character of the loose ends and puzzling ambiguities which are so obviously present in our everyday moral life.

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ENLARGING THE SCOPE OF MENTAL MEASUREMENT

THE possible scope of the art of mental measurement does not seem to have been comprehended by the professional psychologists with whom this art originated. J. R. Kantor in the May 6th number of this JOURNAL called attention to the disappointing lack of results for theoretical psychology from mental tests, due to lack of emphasis on fundamental principle. The school people have had a great deal of curiosity as to how standardized school tests or psychological mental tests work out, but satisfying curiosity has led to nothing more than "additional work," as Mr. Kantor expresses it. These tests have been offered to employment managers for use in selecting good employees, but in spite of their application to more

than a million men during the war, the actual use of such tests to-day by employment managers is trifling. The trade tests might have been very useful, though they were originated by an employment manager, Mark Jones, rather than by psychologists; but they have failed to come into use because of the practical difficulty of duplicating them. It is recognized that the psychological tests (which as Mr. Kantor says, are performance tests the same as trade tests, except that the subject-matter is familiar to psychologists and not to ordinary employers or teachers) lose some of their value as an accurate practical measuring device under the pressure of a public desirous of finding any way "to beat the game" for its own profit.

The writer as an outsider, viewing the use of mental measuring devices from the point of view of an employer and an educator rather than from that of a professional psychologist, sees an almost universal use for practical mental measuring devices. Not only every teacher ought to be able to measure accurately the pupils that come under his or her care, to make sure that personal prejudice and consequent misjudgment are eliminated, but even every individual pupil, every applicant for employment ought to be able to get his own measurement with scientific accuracy. If the pupils in the public schools could be brought convincingly face to face with their own weaknesses, and at the same time could be shown the practical remedy for those weaknesses, there can be no doubt that their attitude toward their studies would be changed and the efficiency of our educational system would be immensely raised.

To the writer the psychologists seem to have been gravely at fault in trying to measure "general intelligence." There is no such thing as "general intelligence," which is a fiction drawn from averaging several specific phases of intelligence. The Alpha army test is made up of eight specific tests, the results of which are added up and rolled into one total. There has been no clear analysis of what each of these eight tests measures or what it signifies; but even if there had been, the specific information would be immediately merged in an average in which the proportion of one faculty as compared with another would be completely lost sight of. The employer already has little difficulty in distinguishing the few applicants who are mentally very superior in every way, or those who are mentally very inferior: his big problem is to differentiate the vast number of mediums, and this he can do only by checking up specific abilities required for specific jobs. Professor Scott remarked to the writer more than a year ago that a series of specific tests was so superior to psychological general intelligence tests in measuring salesmen that he did not expect to use the latter any

more. This seems to be the general consensus of opinion of employment experts. What is more, these specific tests must be in terms already familiar to the employment manager.

If mental tests are to be used by teachers and pupils, or by applicants for employment, they must be in terms which are familiar to those persons, not in terms that are primarily familiar to psychologists only. The whole underlying principle of measurement is expressing the unknown in terms of the known. So long as the results of psychological tests are expressed only in terms familiar to psychologists, they will be used only by psychologists. Sponsors of the movement for mental measurement seem to have given very little consideration to the character and quality of the minds of such persons as employment managers or teachers to whom they have commended their tests, or else they have shown a tendency to depreciate the use of psychological tests by any one other than a professional psychologist.

The fact is that mental measurement is so delicate a process that it can not successfully be applied except under rigidly uniform conditions, and in what is practically a purely mechanical way, with complete elimination of the element of personal judgment. So long as mental measurements are made by experts of any kind whatever, the element of personal judgment is bound to enter in—for what is the use of an expert except to exercise his judgment? It is practically impossible for an expert to refrain from exercising his judgment, and so long as that is true you can have no adequate uniformity that would fully justify the free comparison of one set of results with another. The size of the undertaking caused the army psychological test to approach a uniformity of procedure, but there can be no claim for uniformity in the small experiments that are currently being made, and so no approach is possible toward a universal mental footrule in the class with our mechanical footrule which is deposited with the Bureau of Standards at Washington. Uniformity of conditions do exist in school classrooms pretty generally when classes are of equal size, and there is considerable uniformity of ability and mental habit in the applicants for various definite classes of employment. There is only lacking a thoroughly standardized procedure, from which the element of personal judgment is completely eliminated and the circumstances of the test are rigidly uniform, insuring a uniform attitude of mind on the part of those who take the tests. Painfully little attention has been paid by psychologists to uniform attitude of mind toward experimental tests that have been made, though this is an enormously important factor.

The writer during the last eight years has been carrying on

experiments with a series of nineteen specific tests intended to measure specific abilities for employment in office work and also the educational training intended to fit applicants for such employment. The result would be a bridge of understanding between employers and schools whose pupils were going into employment, especially to find a way to correct the notorious discrepancy between the public school training in the fundamentals of English and arithmetic and the common employment of office boy or general clerk. The tests and methods of procedure and summary of results of these tests have been published elsewhere,¹ but some of the conclusions may be stated here.

1. These tests were intended to be standardized to the use both of employers and educators, and so were specifically in the terms most familiar to employers and educators alike. Later the practical problem of the uniform correction of many thousands of test papers led to a standardized system of having them checked and rechecked by pupils in school, with the result of discovering the vast benefit to pupils themselves of having tests standardized in terms familiar to them, so they could in effect get their own mental measurement on specific subjects on which baffling vagueness and indefiniteness has prevailed.

Business requires a standard of accuracy in the specific matters with which it deals that is distinctly higher than that which prevails in schoolrooms, and a somewhat wide observation has shown that the general habit of accuracy of teachers is scarcely higher than that of pupils. To get the 75 points of a test accurately handled by one hundred teachers dealing with four thousand pupils (as in one case where three different tests were given to the eighth grade in a Brooklyn school district) required a highly organized system of directions to be read "step" by "step," with emphasis so placed that even the most stupid pupils would seldom miss the point, and points missed by the pupils would be caught by others on the rechecking. In effect the accuracy of the business office under long habit and practise was brought into the classroom under the sole influence of a written procedure. This was possible only when the tests were in terms that pupils and teachers could thoroughly understand. In fact it was apparent that when the character of the tests seemed freakish, as many of the psychological tests do, the pupils refused to enter into them with the energy necessary to give a measure of their best abilities. Moreover, it was highly stimulating to them to be raised suddenly to a level of scientific accuracy to which they were unaccustomed, and the skill with

¹ *Commercial Tests and How to Use Them*, by Sherwin Cody, World Book Co., Yonkers, N. Y., gives two complete series of the tests, with a study in detail.

which this was done by means of the standardized directions, with complete elimination of the suspected personal judgment of the teacher, convinced them of the genuineness of these measurements and brought them face to face with their own abilities in a way that evidently astonished and interested them. Ten of these tests were given to all of the seventh, eighth, and ninth grades in the Gary public schools and also in the Racine public schools, and after a five weeks period of intensive drill a second parallel series of the same tests was given by way of measuring the improvement made under this stimulus, an improvement that was very marked and greater than the difference on the first test between the seventh and the ninth grade. (See *Commercial Tests* for full report.)

2. Psychological general intelligence tests have had their special value in giving some indication of original native ability, which there are many reasons to believe is about the same at fourteen years of age in most cases as at twenty or thirty. But all native abilities are subject to development in practise through exercise and knowledge of ways of application, culminating in a habit that becomes subconscious. It is by no means easy to find material for tests which is not influenced by practise. There are two practical difficulties. Those who give the tests are confronted with the question from those whose rating of ability is low, "What are you going to do about it?" If a man of twenty is confronted by a rating as of a child of ten, his situation is to say the least discouraging, and the teacher or examiner is in an embarrassing position. At the same time if the tests are given again, applicants who have a personal interest in making a good record are sure to practise up on the test performances, and so habit enters in as a disturbing factor.

Educational tests have been centered on subjects on which the development of ability was the object of school effort, and parallel tests have been used to measure progress. But the tests have been designed as general samples of work taken at random, and direct concentrated effort at preparing for them has been deprecated.

The tests prepared by the writer have met this situation in two ways. In arithmetic the chief object is an increased habit of accuracy, and this is the result of a consistent effort in that direction—a moral attitude on the part of the pupil. In spelling, grammar, and punctuation the tests were constructed as an epitome of the whole subject. In spelling a list of 1,200 words was compiled from the extensive investigations that have been conducted, and when all of those words were mastered, any test drawn from them could be passed at the hundred per cent. point. In grammar and punctuation the principles had to be applied in a different situation, but as the commonest principles in practical use are few, a test of fifty

points would cover all or nearly all of them, and each new test would measure the progress toward mastering the use of these principles which educators and employers agree ought all to be fully understood and reduced to subconscious habit. In other words, the tests were placed in the direct road of educational habit development and undertook to measure nothing but the development of a habit of mastery of a given narrow subject to a high degree of customary execution. Here the factor of habit through use is controlled and the double use of the tests for employment purposes and educational measurement stimulates an effort on the part of pupils in school which it has never before seemed possible to attain. The mastery of the fundamentals to a high practical degree of accuracy has been one of the great objects of pedagogy that has not been attained through failure to find a system by which pupils might measure their own habits of accuracy and by which they might be convinced of the value in making the necessary effort. This is a direct outcome of mental measurement in terms which the persons tested could understand because they were familiar to them.²

3. Psychological tests undoubtedly were of great use in classifying the soldiers and officers in the army, where five or six large rough groups according to general intelligence were a helpful classification; they have been of distinct use in the special field where they were first used, namely in classifying subnormals at various early ages, and in the study of criminals and other dependents of the state; they may be used in the form of standardized educational tests in making school surveys for purposes of various statistical studies; but they can have little value to individuals until they can be managed in such a way that there is a correlation between the test record and the practical purpose for which the tests are made that is much closer than 80 per cent. Such a correlation means, as one statistician has put it, "we know we are wrong once out of five times." Employment managers by their present hit-or-miss methods may fail more than once out of five times, but they never would be satisfied with a test that they know would be wrong so often as that. Of course this means that variable factors are admitted which inevitably affect the results. If the conditions were controlled, the variable factors could be and ought to be eliminated one at a time, and the tests specialized in such a way that each special test could be depended on to correlate very closely to the 100 per cent. point, though there is a variable human factor which in the most highly

² This system has been embodied in detail in the textbook *Standard Test English*, Association Press, New York, and has been adopted by the United Y. M. C. A. Schools.

specialized business has not been reduced below one per cent.³ This systematic control of variable factors and specializing of tests so that variable correlation reduced to one to three per cent. is entirely possible, and it is imperative if the full possibilities of this instrument are to be realized.

"General intelligence" is doubtless a result of the passion of a democracy for averaging everything. The teacher is satisfied if the average of her class is good, even though many individuals in the class fail completely. When we can get a system of individual mental measurement within three or four per cent. of trustworthy, we begin to have a basis for individual records of ability and improvement, and our school system may be held responsible for certain minimum results in the case of every pupil entrusted to its care.

As a specific case of averaging or generalizing, the writer has often wished to ask Professor Thorndike how he defends the scientific value of his composition scale. Here we have a series of compositions which may have defects of (1) spelling, (2) grammar, (3) punctuation, (4) choice of words, (5) accuracy in the statement of ideas, (6) constructive presentation of ideas, (7) esthetic manner of expression (probably other factors also), all of which have to be averaged together for each scale unit in the mind of the user of the scale without any indication as to what weight any single factor ought to have, and then this average compared with a similar average for a composition which is to be rated, the subject-matter of which may be entirely different. The simple identification of one such average with another similar average is certainly a step better than the rude guesswork now employed by all sorts of teachers in grading all sorts of compositions on a very rough percentage scale (so rough and rude that by reason of giving different weights to different elements the same composition has actually been graded 40 per cent. and 90 per cent.). Not the least variable element is the judgment of the teacher who does the averaging and comparing. Why should not each of the above mentioned factors, or at least several of them, be measured by themselves, ideas required for an assigned subject counted, and comparison with a scale model limited to the one subject of clearness of expression or perhaps wording or expression in general if too fine division becomes impracticable; and the consensus of opinion of a group of pupils substituted for the single opinion of any one instructor? Such a method seemed to

³ In the accounting department of Marshall Field & Co. it was found that the greatest experts in figures would make about one per cent. of errors, and all the figuring is done three times over so as to dilute that one per cent. to what is practically nothing.

work well in the writer's test on answering letters, or test for practising correspondents.

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NEW YORK.

“DR. WILDON CARR'S THEORY OF THE RELATION OF
MIND AND BODY”

MR. J. E. TURNER in his criticism¹ of some points in my address to the Aristotelian Society on the “Interaction of Mind and Body”² shows a full appreciation of the main point for which I was contending. The relation of mind and body is a union in which two whole, and completely distinct, ordered systems develop continuously, but in such a way that no modification of either system is partial. There is no point to point correspondence between the parts, or between the details of the changes, in the two systems. The articulation of each system is *sui generis* and the two systems interact, but only as whole with whole.

I do not propose to try to answer Mr. Turner's criticisms because they are quite fair and do not in any way misrepresent me. To answer them therefore I should have simply to develop my argument. I desire only to add a word on the main question.

I do not pretend that in establishing this character of the interaction, namely, that it is between individual wholes, I have given at last a final and satisfactory solution of the problem of the relation of mind and body. I am quite ready to admit that the concept of the ultimate nature of the metaphysical reality—*élan de vie* or whatever other term is preferred—is not thereby brought within our apprehension. What I do claim for my theory is that it does enable us finally to relegate to the museum of psychological curiosities the epiphenomenon theory, the double aspect theory, and every form of psycho-physical parallelism. My theory leaves us interaction as a fact, but the mode of it, as hitherto generally understood, is completely transformed. The concept of physical causation offers no analogy. The mind does not, when its scheme is elaborated, press a button and set the body in motion. The whole mind at every moment of developing experience determines the attitude of the body. How? We do not know, that is, we do not know the force which brings about the conformity of the two systems. The manner or mode we do know. The control of the body by the mind is exercised as a degree of concentration or relaxation in a tension.

¹ This JOURNAL, Vol. XVII., No. 10, May 6, 1920.

² *Proceedings of the Aristotelian Society*, Vol. XVIII.